9 The human sciences

'I am more interested in how a man lives than how a star dies.'
Sherwin Nuland, 1930–

'In every science man speaks only of himself.'
Oswald Spengler, 1880–1936

'We make our surroundings and then they make us.'
Winston Churchill, 1874–1965

'Life is heredity plus environment.'
Luther Burbank, 1849–1926

'If the brain were simple enough to understand, we would be too simple to understand it.'
Anon

'The only possible conclusion the social sciences can draw is: some do, some don't.'
Ernest Rutherford, 1871–1937

'An economist is an expert who will know tomorrow why the things he predicted yesterday did happen today.'
Laurence J. Peter, 1919–88

'It is quite possible – overwhelmingly probable, one might guess – that we will always learn more about human life and human personality from novels than from scientific psychology.'
Noam Chomsky, 1928–

'Maybe in order to understand mankind we have to look at the word itself, MANKIND. Basically, it's made up of two separate words – "mank" and "ind". What do these words mean? It's a mystery, and that's why so is mankind.'
Jack Handey, 1949–

'Human behaviour makes most sense when it is explained in terms of beliefs and desires, not in terms of volts and grams.'
Steven Pinker, 1954–

'In carefully controlled laboratory conditions animals do what they damned well please.'
The Harvard law of animal behaviour

'Know then thyself, presume not God to scan / The proper study of mankind is man.'
Alexander Pope, 1688–1744

'We need more understanding of human nature, because the only real danger that exists is man himself.'
Carl Jung, 1875–1961

'I can calculate the motions of heavenly bodies, but not the madness of crowds.'
Sir Isaac Newton, 1642–1727

Introduction

Since human beings have been able to reflect about themselves and their place in the scheme of things, they have been struck by their own complex and mysterious nature. The human sciences are an attempt to reduce the mystery by studying human behaviour in a systematic way. Under the heading 'human science' (or social science) are subjects such as psychology, economics, anthropology and sociology. Despite the obvious differences between these subjects, they are all based on observation and seek to discover laws and theories about human nature.

We may, however, wonder to what extent human beings can be studied in a purely scientific way. At one level we are simply animals composed of atoms and molecules. According to the theory of evolution, we have descended from the apes, with whom we share 99% of our genes. And we are made up of the same basic ingredients as all other living things – 63% hydrogen, 25.5% oxygen, 9.5% carbon, 1.5% nitrogen, and 0.5% of a few other elements.

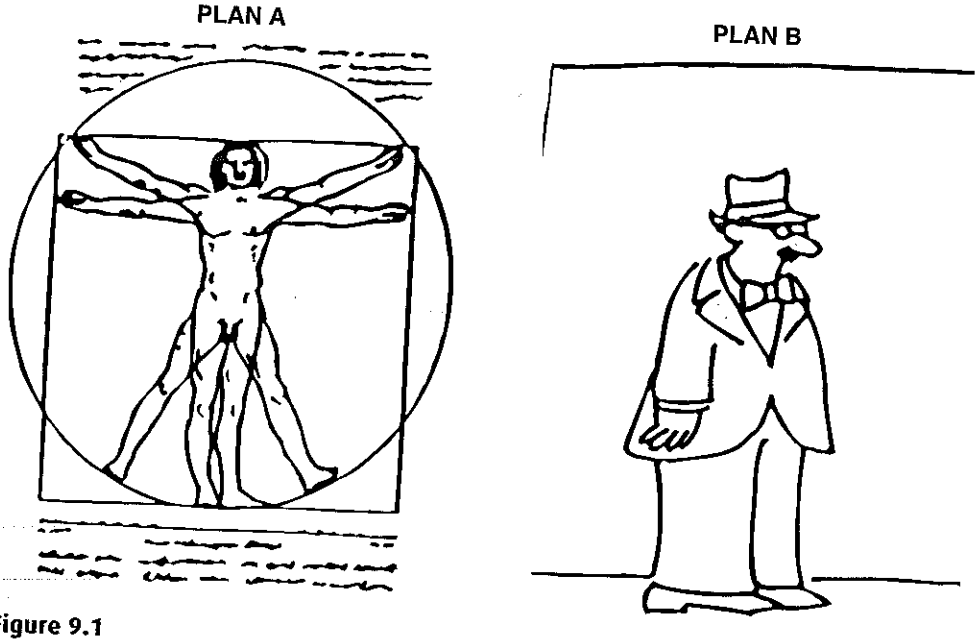

Figure 9.1

But most people would reject the idea that we are 'just animals', or 'nothing but a bunch of chemicals', and would draw attention to the differences between us and the rest of the natural world. One of our most important distinguishing characteristics – from which all others could be said to flow – is that we are *self-conscious* animals. Many other animals are conscious, but unlike us it seems that they are not aware of themselves. Some evidence for this is provided by the so-called **mirror test**. Although you recognise yourself in a mirror, a dog will bark at its own image without ever realising that it is barking at itself. (Some chimpanzees have passed the mirror test, and this suggests that they may have the glimmerings of self-consciousness.)

Among the other features associated with self-consciousness that seem to be unique to us are **language**, **reason**, **free-will** and **creativity**. Some people also believe that we have an animating spirit or soul which cannot be explained in terms of material processes. Whatever your opinion about this, there are likely to be special challenges in studying human beings in a scientific way.

In this chapter, we will look at four key aspects of the scientific method – observation, measurement, experiments and laws – and consider what special problems arise when these steps are applied to the study of human beings. This will lead on to a more general discussion of the similarities and differences between the natural and human sciences.

Activity 9.1

1 List as many features as you can that distinguish human beings from other animals.
2 To what extent do these features make it difficult to study human beings in a scientific way?

Observation

Perhaps the most important characteristic of science is that it is based on observation. One problem in the human sciences is that, although you can observe other people's behaviour, you cannot directly observe their minds. You may be able to make an educated guess about what they are thinking, but you can never be entirely sure that you are right.

One way to find out what people think is, of course, to ask them. Since most people are reasonably honest, we can learn a lot from questionnaires, opinion polls and interviews. At the same time, since people generally want to see themselves in a good light, you cannot always take what they say at face value. There is evidence from psychology to suggest that we tend to overestimate our strengths and underestimate our weaknesses. For example, in one well-known survey of a million US high-school seniors, *all of them* ranked themselves as above average in terms of their ability to get on with other people! Since people care about what others think of them, they may also be unwilling to admit holding unpopular opinions. This may explain why extreme political parties often do better in general elections than in opinion polls.

Activity 9.2

1 Complete the following short questionnaire as honestly as possible. Then collate the results for the class as a whole. How would you interpret the results and what conclusions would you draw from them?

	Below average	Average	Above average
a How much do you worry about what other people think of you?			
b To what extent do you see yourself a considerate person?			
c Do you have a good sense of humour?			
d How open are you to new ideas?			
e How worried are you about environmental problems?			

2 In some countries it is forbidden to publish opinion polls in the week running up to a general election. Do you think that this is a good policy, or a denial of free speech?

Loaded questions

Another problem with asking people what they think is that it is not easy to frame questions in an unbiased way. A **loaded question**, which contains a hidden assumption, may encourage people to answer one way rather than another. Consider, for example, the following 1980 US poll in which a similar question was worded in two different ways:

	In favour	Opposed
1 Do you think there should be an amendment to the Constitution prohibiting abortions, or shouldn't there be such an amendment?	29%	67%
2 Do you believe there should be an amendment to the Constitution protecting the life of the unborn child, or shouldn't there be such an amendment?	50%	34%

Activity 9.3

1 Which of the above questions do you think is loaded? Give reasons.
2 Take a controversial topic – such as abortion, or capital punishment – and try to design an unbiased questionnaire to discover people's opinions about it.

This example suggests that if you ask questions with sufficient skill and cunning, you may be able to get people to give you the answer you want. An amusing example of this can be found in an episode of the British comedy series *Yes, Prime Minister*. Two bureaucrats, Sir Humphrey Appleby and Bernard Woolley, are discussing an opinion poll which shows that 67 per cent of people are in favour of reintroducing National Service (compulsory military service). Sir Humphrey asks Bernard to commission another opinion poll which will give them the opposite result. When Bernard asks how this can be done, Sir Humphrey demonstrates how two different lines of questioning can lead a person to give a different answer to the same question.

Line One

'Mr Woolley, are you worried about the rise in crime among teenagers?'

'Yes'

'Do you think there is lack of discipline and vigorous training in our Comprehensive Schools?'

'Yes'

'Do you think young people welcome some structure and leadership in their lives?'

'Yes'

'Do they respond to a challenge?'

'Yes'

'Might you be in favour of reintroducing National Service?'

'Yes'

Line Two

'Mr Woolley, are you worried about the danger of war?'

'Yes'

'Are you unhappy about the growth of armaments?'

'Yes'

'Do you think there's a danger in giving young people guns and teaching them how to kill?'

'Yes'

'Do you think it's wrong to force people to take up arms against their will?'

'Yes'

'Would you oppose the reintroduction of National Service?'

'Yes'

A final point we can make about questionnaires is that there is often a difference between what people say they would do in a hypothetical situation and what they actually do in reality. You might, for example, say that you would be willing to buy a product at a certain price, but have second thoughts about it when you actually have to part with your money. More dramatically, you might fondly imagine that if you were trapped in a burning building, you would selflessly help other people to escape before leaving yourself. We are all heroes in our dreams, but if this happened in reality, you might be the first to run for safety!

"How would you like me to answer that question? As a member of my ethnic group, educational class, income group, or religious category?"

Figure 9.2

The observer effect

Another problem with observation in the human sciences is the so-called **observer effect**. If a geologist is studying rocks they are indifferent to his presence; but if a psychologist is observing people they may become nervous or embarrassed by his attention and this may lead them to change their behaviour.

Imagine, for example, learning that national TV are coming to your school tomorrow to film a typical Theory of Knowledge class. How would this affect your behaviour? You might dress differently, try to look interested in class, and speak with unusual eloquence. Or you might be so anxious not to make a fool of yourself that you are not able to contribute at all. Either way, the presence of the TV cameras will ensure that the class is not a typical one.

Activity 9.4

1. What ways, if any, are there of getting round the 'observer effect'?
2. Reality TV has become popular in many countries, with series like *Big Brother*, *Survivor* and *Star Academy*. What, if anything, do we learn about human nature from such programmes?

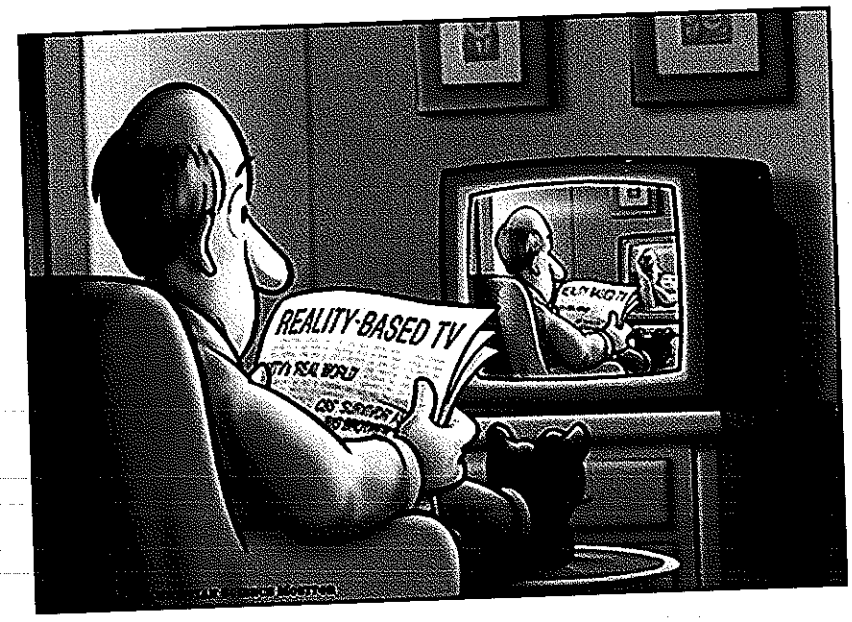

Figure 9.3

There are at least two ways in which a human scientist can try to get round the observer effect. The first is *habituation*. If national TV came and filmed your TOK class for a whole term, you would probably get used to the presence of the cameras and eventually ignore them. Anthropologists use a similar strategy when they **go native** and live with a tribe for an extended period of time. The hope is that the people they are studying will eventually get used to them and behave normally in their presence.

Another solution to the observer effect is to use hidden cameras. If you don't know that you are being observed, then it won't affect your behaviour. But this raises ethical questions about whether or not it is acceptable to film people without their knowledge.

A variant of the observer effect concerns the way in which a prediction can affect what is predicted. A classical example of this can be found in the Greek tragedy *Oedipus Rex*. When Oedipus was born, a prophecy was made that he would kill his father and marry his mother. When his father, the king of Thebes, learned of this he was horrified and abandoned the new-born child in the mountains, hoping that he would die so that the prophecy would not come true. But Oedipus was rescued by a shepherd and eventually adopted by the king and queen of Corinth. He grew up believing that they were his real parents. Then, as a young man, he learned of the prophecy about himself and fled home in terror. On the road, he got into an argument with a stranger and killed him. He then turned up in Thebes where he eventually married the recently widowed queen. Without realising it, Oedipus had killed his father and married his mother. When at the end of the play, he discovered the truth, he was not a happy man. Sophocles' tragedy derives its power from the fact that in the very act of trying to escape the prophecy Oedipus brought it down on himself. If only he had stayed in Corinth, everything would have been fine!

The effects of predictions on human behaviour are not usually as dramatic as in *Oedipus Rex*, but they can still have serious consequences. Here are three examples taken from different human sciences.

1 Psychology

In a well-known psychology experiment, school children were randomly allocated to one of two groups labelled 'bright' and 'less bright'. Although there was no initial difference between the two groups, the children labelled 'bright' made greater academic progress in the following year than the students labelled 'less bright'. This suggests that teachers' expectations affected how well the students did and helped to produce the differences between the two groups.

Activity 9.5

1 To what extent do you think your teachers' expectations about your abilities affect how well you do at school?
2 Would it be better if teachers had no expectations about you? To what extent is that possible?
3 Do you think that primary-school teachers should divide up children into good readers and not-so-good readers? What would be the pros and cons of doing this?
4 To what extent can your own expectations about yourself affect your academic performance?

2 Economics

If you follow the stock market, you are probably aware that people's expectations can affect share prices. In a ***bull market***, when most people expect prices to rise, a rational investor will buy stocks now, hoping to sell them later at a higher price thereby making a profit. If everyone behaves like that, the demand for stocks will increase and cause prices to rise. Conversely, in a ***bear market*** when most people expect prices to fall, a rational investor will sell stocks now, hoping to buy them back later at a lower price. But if everyone does that, the increased supply of stocks will push prices down. So if everyone expects prices to rise they will rise, and if everyone expects prices to fall they will fall.

Activity 9.6

1 Do you think the behaviour of stock markets is governed more by reason or more by emotion?
2 Do you think that it is possible to predict with accuracy where the stock market will be in twelve months' time? Give reasons.

3 Anthropology

According to anthropologist Wade Davis, when a sorcerer in an aborigine tribe points at an individual and casts a death spell over him, 'the individual invariably sickens and almost always dies'. One explanation for such cases of 'voodoo death' is that the individual has been conditioned since childhood to believe in the power of the sorcerer's spell. So when the sorcerer curses him, he in effect loses the will to live. He may, for example, retire to his shelter and refuse to eat until he wastes away and dies. The individual's belief that he is going to die seems to be an important factor in his eventual death.

Activity 9.7

1 Have you ever been caught breaking a **taboo** and said something like 'I feel so ashamed I could die'?
2 Do you think that mental states, such as happiness or depression, can affect our physical well-being?
3 Try to find some information about alleged cases of 'voodoo death'. Do you believe they really happen? If so, how would you account for them?

A final point to notice about predictions is that they can be self-negating as well as self-fulfilling. For example, if I predict that you are going to break your leg playing soccer this afternoon, you will have a strong incentive not to play, thereby falsifying my prediction. In this case, the very act of making the prediction helps to ensure that it does *not* come true.

Activity 9.8

According to a phenomenon known as **psychological reactance**, if a person is inclined to do X, and you then tell him to do X, he becomes more likely not to do X. This may explain why some teenage anti-smoking campaigns have the perverse effect of *encouraging* teenagers to smoke. With this in mind, how would you try to organise an effective anti-smoking campaign?

Measurement

While measurement plays an important role in the sciences by adding precision to our knowledge, it is generally more difficult to measure things in the human sciences than in the natural sciences. Consider, for example, consciousness. If I were to ask you *how many* thoughts you have had today, I doubt that you could answer this question. Part of the problem is that we have no units for measuring thoughts and determining where one ends and another begins, for they simply melt into one another. Furthermore, if you try to count your thoughts, the very process of counting will interfere with what you are trying to count. So, rather than think of consciousness as a series of discrete thoughts, it may make more sense to follow the American psychologist William James (1842–1910) and think of it as a continuous **stream of consciousness**.

While consciousness played a key role in William James' conception of psychology, some twentieth-century psychologists dismissed it as unscientific on the grounds that it can be neither objectively observed nor precisely measured. This gave rise to a school of psychology known as **behaviourism**, which redefined the subject as the scientific study, not of consciousness, but of *behaviour*. Despite the difficulties involved in trying to pin consciousness down, there are many variables in the human sciences that *can* be measured with relative ease: for example, population, income and the rate of inflation. Furthermore, as the Jared Diamond reading at the end of this chapter makes clear, human scientists have developed a variety of sophisticated techniques for translating what look like qualitative concepts into measurable ones.

Activity 9.9

1 When you try to make sense of other people, do you pay more attention to what they say or to what they do?
2 Do you agree that since consciousness cannot be objectively observed, it should not be part of psychology?
3 Would you be willing to reject talk of electrons in physics and genes in biology on the grounds that they cannot be directly observed?

Who really won the Centennial Olympics?

When we put numbers on things it sometimes creates a spurious sense of objectivity. After the 1996 Olympic Games in Atlanta, an article appeared in a Canadian newspaper headed 'Who really won the Centennial Olympics?' You might think that we can find the answer simply by consulting the official rankings.

Rank	Country	Medals total
1	USA	101
2	Germany	65
3	Russia	63
4	China	50
11	Canada	22

The above table shows some of the results, ranking the countries in terms of the total number of medals won. The USA came first with 101 medals, and Canada eleventh with 22. However, you might point out that simply knowing the *number* of medals each country got does not give us enough information to decide who really won the Olympics. We also need to know the *colour* of the medals. If the USA had 101 bronze and Germany 65 gold, there would be a strong case for saying that Germany, not the USA, had won the Olympics. Here, then, is the breakdown of medals won:

Country	Gold	Silver	Bronze	Medals total
USA	44	32	25	101
Germany	20	18	27	65
Russia	26	21	16	63
China	16	22	12	50
Canada	3	11	8	22

We now have to decide how to *interpret* these figures. Consider Germany and Russia: Germany won two more medals in *total* than Russia, but Russia won six more *gold* medals than Germany. So who did the best? Well, the standard Olympic convention is to award 3 points for a gold, 2 for a silver and 1 for a bronze. Following that convention we get the following results:

Rank	Country	Gold	Silver	Bronze	Points
1	USA	44	32	25	221
2	Russia	26	21	16	136
3	Germany	20	18	27	123
4	China	16	22	12	104
11	Canada	3	11	8	39

The only change at the top is that Russia and Germany change places. Canada stays in eleventh place.

But what if we now take into account the *population* of each country? After all, the USA has a much larger population base than Canada from which to choose its athletes. (At the time of the Atlanta Olympics, the figures were 255 million as against 28 million.) This dramatically changes the picture. If we now look at points per million we get the following result:

Rank	Country	Points per million
1	Tonga	20
2	Bahamas	6.6
3	Cuba	4.6
25	Canada	1.3
37	USA	0.9

If we look at the results in this way, some island nations rise to the top of the table. Cuba's results are now more than five times better than those of the USA, and Canada's results are 1.5 times better.

But we don't have to stop there. We might think of more ways of refining the ranking.

- Since children and seniors do not form part of the pool of potential athletes, we should perhaps take into account age distribution, and look not at points per million, but points per million of eligible age – say between 16 and 60.
- We might consider comparative wealth on the grounds that athletes from wealthy countries have better training facilities than their poorer counterparts.
- We might want to compensate for the fact that the USA had 'home advantage' – for it is well known that a team playing at home tends to do better than one playing away from home.

We now risk getting lost in a welter of rankings established in accordance with different criteria. It is beginning to look as if there is no clear answer to the question, 'Who won the Centennial Olympics?' Perhaps we should simply abandon the obsession with ranking countries. That, however, is easier said than done!

Activity 9.10

1 Do you think it is possible to answer the question 'Which country won the Centennial Olympics?' Does it matter?
2 'You can no more say that a gold medal is worth three bronzes than that an apple is worth two oranges.' What do you think of this criticism of Olympic rankings?
3 What effect do you think doing well in the Olympics, or winning the World Cup, might have on a country's economy?
4 What value, in general, is there in ranking things? Have you ever looked at university rankings? How seriously do you take them? How seriously should you take them?

One thing that seems to come out of the above discussion is that we run into problems when we try to measure different things – such as gold, silver and bronze medals – on a common scale. People are often accused of 'comparing apples and oranges' when they try to do this. However, an economist might argue that we can in fact compare different things on a common scale by looking at how much people are willing to pay for them. Whether or not it is in practice possible to put a price on everything, I leave for you to decide!

Activity 9.11

1 How would you go about trying to put a monetary value on a human life?
2 Can you think of situations in which society does the above? How do you feel about trying to weigh a life in terms of dollars and cents?
3 Which of the following is easy to measure and which is not? How would you go about trying to measure it?

a Weight	b Brand loyalty
c Temperature	d Social class
e Inflation	f Intelligence
g Happiness	h Reading ability
i Progress	j Age

4 What truth do you think there is in the following poem?

Economists have come to feel
What can't be measured isn't real.
The truth is always an amount
Count numbers only numbers count.
[Robert Chambers]

Experiments

We typically associate the word 'science' with a person in a white coat doing experiments in a laboratory. Ideally, experiments should play as big a role in the human sciences as they do in the natural sciences; but in practice this is not usually the case. There are at least three reasons for this.

1. Human scientists are often trying to make sense of complex real-world situations in which it is simply impossible to run controlled experiments.
2. The artificiality of some of the experiments that can be conducted may distort the behaviour of the participants.
3. There are ethical reasons for not conducting experiments that have a negative effect on the people who participate in them.

Faced with the above difficulties, what are human scientists to do? One solution is to wait for nature to provide the appropriate experimental conditions. We can, for example, learn something about how a normal brain functions by looking at people who have suffered brain damage; and we can gain some insight into the roles played by genes and the environment by studying identical twins who have been separated at birth and brought up in different families. In the case of economics, economic history can provide us with a bank of – admittedly not very well-controlled – experimental data.

However, human scientists do not just sit around waiting for natural experiments to arise. They also devise ingenious experiments of their own. Suppose you want to know how a baby sees the world. Does it see it as a 'blooming, banging confusion' as the psychologist William James (1842–1910) thought, or is there more of a structure to its experience? We cannot, of course, ask the baby since it has not yet learnt to speak. So it might seem that all we can do is *speculate*. That is what people thought until two psychologists, Elizabeth Spelke and Renée Baillargeon, pointed out that babies tend to stare at surprising things longer than at unsurprising ones. This key insight was like opening a window on to the developing mind. There was now a way of testing babies' expectations and getting some idea of how they see the world. The resulting experimental evidence suggests that, before they are six months old, babies have figured out that objects consist of parts that move together, are aware of the difference between living and non-living things, and can even do simple arithmetic!

Activity 9.12

1. How accurate do you think 'stare time' is as a way of measuring a baby's expectations? What if a baby looks at something for two seconds, looks away for three, and then looks back again for another two?
2. Do you think there is any danger in psychologists seeing what they want to see in these kinds of experiment?

The Milgram experiment

One of the best-known experiments in the history of psychology took place at Yale (USA) in 1963. Stanley Milgram was interested in the extent to which people are willing to obey orders. He advertised for volunteers to participate in an experiment allegedly to 'test the effects of punishment on learning'. When a volunteer arrived he was told that he was to play the role of 'teacher', and another 'volunteer' – in reality an actor – was to play the role of 'learner'. The learner was strapped to a chair and electrodes were put on his wrists. The teacher was then taken to an adjoining room and asked to give the learner a simple memory test. Every time the learner answered incorrectly, the teacher was to give the learner a successively higher electric shock by flicking a switch on a generator. Each switch was clearly labelled with voltage levels ranging from 15 to 450 volts, and verbal descriptions such as 'slight shock', 'strong shock', 'intense shock', 'danger', and finally 'XXX'. Although the teacher could not see the learner, he was able to hear his responses. Once the voltage reached 120V, the learner began to complain; at 150 volts he demanded that the experiment be stopped; at 270V he started screaming; and after 330V there was an ominous silence. Whenever the teacher hesitated to administer a shock, a scientist standing behind him insisted that it was very important that he continue with the experiment. In reality, of course, the learner did not receive any shocks, but the 'teacher' was not aware of this at the time.

Activity 9.13

1 Given your knowledge of human nature, what percentage of 100 volunteers do you think would continue administering electric shocks up to 450 volts?
2 If you had been a volunteer in this experiment, what do you think you would have done?

The result of the experiment was that almost two-thirds of the volunteers continued to give electric shocks up to 450 volts. Many expressed concern about what they were doing, and had to be reassured that they would not be held responsible for the fate of the learner; but it did not seem to occur to them to refuse to comply. Only one-third of the volunteers refused to continue to the end.

The Milgram experiment raises some disturbing questions about human nature. Why were so many of the volunteers willing to obey white-coated authority figures and give what they thought were lethal shocks to complete strangers? One crumb of comfort was that if, instead of working alone, the volunteer was paired with two other teachers (who were again actors), and the other teachers rebelled, then only 10% of the volunteers were willing to continue giving shocks up to 450 volts.

Changing perspective, we might question the ethics, not of the participants, but of the experiment. After all, the volunteers were misled about what they were getting involved in, were made to feel uncomfortable during the experiment, and may have suffered a permanent loss of self-esteem once the experiment was over. You are probably not going to feel great about yourself if you discover that you are the kind of person willing to administer a lethal electric shock to a stranger! On the other hand, it could be argued that the knowledge gained from the experiment outweighs any moral qualms we might have about the way it was carried out.

Activity 9.14

1 What difference do you think it would have made if the original advertisement asking for volunteers had mentioned electric shocks? What conclusion would you draw from this?
2 Design your own ethical code of conduct for the running of experiments in the human sciences. What three or four key points would you include and why?

Laws

While observation, measurement and experimentation are important parts of the scientific method, the main goal of science is to develop laws and theories to explain the phenomena that it studies. When it comes to the human sciences, however, our belief in **human free-will** would seem to conflict with the idea that there are law-like regularities in human behaviour. How, after all, could we ever reduce the behaviour of inconsistent, wilful and unpredictable human beings to a neat set of laws? Isaac Newton (1642–1727), for one, was doubtful, and famously observed: 'I can calculate the motions of heavenly bodies, but not the madness of crowds.'

Despite Newton's comment, a great deal of human behaviour does in fact seem to be fairly predictable. If people lack food, they are unhappy; if the price of lemons goes up, people buy fewer lemons; and – at least in the last school I worked in – if someone drops their tray in the dining hall, everyone cheers! We make literally thousands of generalisations about human beings every day, and if they were completely unpredictable no one would ever get in to a car and venture onto the road.

Activity 9.15

1 To what extent do you find the behaviour of your friends and family predictable? Do you ever find that when your parents are giving you advice you are able to finish many of their sentences for them?
2 What makes a person an interesting person? Would you prefer to have predictable friends, or unpredictable friends, or some combination of the two?
3 State three generalisations about human behaviour that you think are true of all human beings.

The law of large numbers

Although individual behaviour may be unpredictable, we can make surprisingly accurate short-term predictions about such things as the number of births, marriages and deaths in a country. The explanation for this derives from the **law of large numbers**, which says that in a large population *random variations tend to cancel out*. For example, there are all kinds of social customs and expectations which affect the number of people who get married in a particular time period. In general we can say that confirmed bachelors are

unlikely to get married and engaged couples are likely to get married. However, random factors are also at work and occasionally confirmed bachelors fall in love and marry, and engaged couples fall out of love and do not. If we are dealing with a large enough population, then the number of unexpected marriages is likely to be cancelled out by the number of unexpected non-marriages.

Activity 9.16

Briefly explain how the law of large numbers enables insurance companies to offer cover against risks such as car accidents, house fires, and death.

Since the law of large numbers enables us to predict group rather than individual behaviour, many laws in the human sciences are probabilistic in nature. Although I cannot predict with any certainty whether or not John Smith will get married this year, I may be able to predict the probability of this happening.

You might think that such probabilistic laws are inferior to the universal laws that are typically associated with the natural sciences. But in fact the laws governing the behaviour of atoms and genes are also of a probabilistic kind, and a physicist can no more predict the behaviour of an individual gas molecule than a human scientist can predict the behaviour of a man in a crowd.

Trends and laws

Despite the law of large numbers, the human sciences do not have a very good record of prediction. There is, for example, no consensus among demographers about the size of world population in fifty years' time; economic forecasters seem to get it wrong as often as they get it right; and almost no one predicted the collapse of communism in the 1980s. A well-known example of a prediction that turned out to be way off the mark was the one made by the population economist Paul Ehrlich in 1973. Ehrlich was very pessimistic about the state of the planet and he predicted that, by 1990, 65 million Americans would be starving to death. Ironically, that turned out to be the number of Americans who were overweight in 1990!

To understand why the predictions of human scientists sometimes turn out to be wrong, we need to explain the difference between a *trend* and a *law*. Critics argue that too often human scientists have simply uncovered trends rather than genuine laws. A trend shows the direction in which a variable is moving, but since it gives no explanation for the movement it is not very reliable. That is why 'betting on a trend' is a dangerous game. A horse may have won its last three races, and a company may have made profits for the last three years, but this alone does not mean that the horse will win its next race or the company will make a profit next year. If we know something about the horse's breeding and physical condition, or the company's financial background and investment strategy, we are likely to make better predictions than if we simply bet on a trend.

A good example of the danger of betting on a trend is the **Phillips curve** in economics. In the 1960s, an economist called A. W. Phillips gathered data on the relationship between inflation and unemployment in the UK from 1861 until 1967. The data appeared to suggest a stable relationship between the two, as illustrated in Figure 9.4.

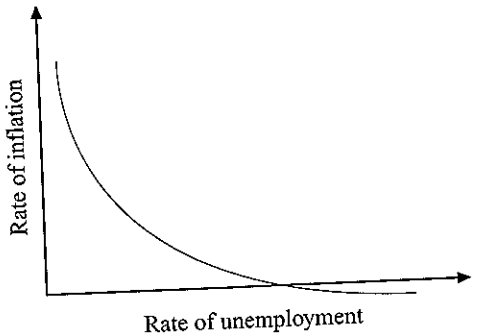

Figure 9.4 A Phillips curve

Many governments understood the curve to show that there was a trade-off between inflation and unemployment, and that lower unemployment could be bought at the cost of higher inflation, and vice versa. Unfortunately, when they tried to reduce unemployment by allowing inflation to rise, the Phillips curve broke down, and for much of the 1970s many countries experienced both rising inflation *and* rising unemployment.

What this example shows is that just because two things are *correlated* it does not follow that the first is the cause of the second. To think that it does is to commit the **fallacy of *post hoc ergo propter hoc*** (see Chapter 5). A correlation between two variables, A and B, could mean either that A causes B, or that B causes A, or that A and B are both caused by some other factor, C.

Activity 9.17

How might you explain each of the following correlations?

a Children with low self-esteem tend to do badly at school.
b People who watch violent movies tend to be violent in real life.
c As a country develops economically, birth rates tend to go down.
d Children brought up by talkative parents tend to be talkative themselves.
e Married people tend to be happier than unmarried people.

The complexity of real-world situations

Another reason why it might be difficult to uncover laws in the human sciences is the complexity of the situations they deal with. In the real world, it is often difficult to untangle a complicated web of causal relationships to determine which one is decisive.

Imagine, for example, that one night a man is driving along a country lane and crashes into a wall. He is lucky to escape unhurt, but his car is a write-off. What caused the crash? Here is some background information.

- The accident happened on a sharp bend on an unlit road.
- There was ice on the road.
- The man was speeding.
- He had drunk two pints of beer earlier in the evening.
- He was known to enjoy driving fast.
- He had just broken up with his girlfriend.

Given this information, it may be impossible to determine the *one* thing that caused the crash. Rather than search for a single cause, it might make more sense to say that it resulted from a *combination* of things. Perhaps if any one of the above facts had been different, the accident would never have happened. What this suggests is that it may be impossible to come up with a simple law of car accidents of the form 'If *X*, then there will be a car accident.'

If it is difficult to determine the cause of a small-scale event like a car accident, then it is a great deal more difficult to determine that of such complex phenomena as teenage depression, crime or inflation. And if we cannot say what the cause of an event was, then it will be hard to predict what will happen when similar events happen in the future. So it is perhaps not surprising that economists sometimes get their forecasts wrong!

Summary: the role of laws in the human sciences

We have seen that, although individuals may be unpredictable, the law of large numbers means that we can sometimes make accurate predictions about the behaviour of a large population. However, some of these predictions are based on trends rather than laws, and we should be careful not to confuse a correlation with a causal connection. In practice, the complexity of real-world situations means that it is difficult to unearth simple laws of the 'If..., then...' variety. Nevertheless, subjects such as economics still have many tried and tested laws, such as the law of demand and the law of diminishing returns.

The relationship between natural and human sciences

When we consider the relationship between the various sciences, it is commonly thought that there is a continuum of subjects running from the 'hard' natural sciences to the 'soft' human sciences. This reflects the fact that the human sciences have generally been held in lower esteem than their natural science cousins. For they seem to lack the explanatory power of Newtonian mechanics, or the atomic theory of gases, or molecular biology. Human scientists themselves have sometimes envied the mathematical rigour, immutable laws and cumulative nature of the natural sciences; and some people might even agree with Ernest Rutherford's (1871–1937) dismissive observation that, 'The only possible conclusion the social sciences can draw is: some do, some don't.'